

Office Action Summary

Application No.

10/789,485

Applicant(s)

STOLZE, THILO

Examiner

Andrew O. Arena

Art Unit

2811

Period for Reply -- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 September 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 5) ☒ Claim(s) 1, 3-5, 8, 9, 11, 13, 14 and 17-24 is/are pending in the application.
- 5a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) ____ is/are allowed.
- 7) ☒ Claim(s) 1, 3-5, 8, 9, 11, 13-14 and 17-24 is/are rejected.
- 8) ☐ Claim(s) ____ is/are objected to.
- 9) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-886)
Paper No(s)/Mail Date ____

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/789,485	02/27/2004	Thilo Stolze	5497-015	7994
57579 7590 09/01/2011 COATS & BENNETT/INFINEON TECHNOLOGIES 1400 CRESCENT GREEN SUITE 300 CARY, NC 27518				
EXAMINER ARENA, ANDREW OWENS				
ART UNIT 2811		PAPER NUMBER		
NOTIFICATION DATE 09/01/2011		DELIVERY MODE ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

INFINEON@COATSANDBENNETT.COM

DETAILED ACTION

Reopen Prosecution

In view of the Appeal Brief filed on 9/2/2010, PROSECUTION IS HEREBY REOPENED. New grounds of rejection are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below:

*/LYNNE GURLEY/

Supervisory Patent Examiner, Art Unit 2811**.

Status of Prosecution

This Office Action presents new grounds of rejection which were not necessitated by amendment or IDS submission.

Accordingly, this action is non-final. See also MPEP § 706.07(a).

Update to Phone Interview

To clarify the record, a phone interview between Examiner and Mark Bilak was held 8/25/2011 and ended with the understanding that this application would be passed to issue by Examiners' Amendment. However, Examiner has since noticed that the agreed-to amendments would not be sufficient to place all claims in condition for allowance.

Examiner apologizes for not noticing these further deficiencies at the time of the interview. Attempts to contact Applicant's representative to make further changes were unsuccessful. Because explicit authorization could not be secured for further amendments, no further amendments have been made.

During the interview, Examiner indicated that certain structural features as depicted in the figures could not be found in the prior art and that claims which adequately recited such features would be allowed. Agreement appeared to be reached that the allowable feature is a single continuous "connecting element" which is in direct contact with side faces of two adjacent substrate regions.

Examiner indicated that the language of claim 1 – "the connecting element directly contacts the side faces of...two adjacent substrates" – adequately captured the allowable feature. However, it has become clear that the other independent claims do not adequately express this feature. Further, deficiencies in specific formal matters have been addressed by rejection under 35 USC 112.

Response to Arguments

The arguments filed 9/2/2010 were fully considered but are moot in view of the fact that all rejections based on Ali have been withdrawn.

An appeal conference was held and it was decided Ali did not show all of the claimed features as indicated in the previous prior art rejection and an updated search was necessary. After thorough updated search, specific claims have been found to contain allowable subject matter and pertinent prior art has been applied to the remaining claims, as detailed herein.

Applicant's cooperation is requested in contacting the Examiner if any further issues remain unresolved and to advance the prosecution of the instant application.

Specification

The title has been changed to "Power Semiconductor Module with Plural Substrates and Elastic Connecting Element Therebetween".

Claim Rejections - 35 USC § 112

Claims 14, 17-21 and 23 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 14 recites "one or a plurality of elastic connecting elements directly contacting opposing side walls of two adjacent substrate regions". There does not appear to be any support for a plurality of connecting elements making such contact. This language does not appear to be found in the specification, and the drawings only show one connecting element per adjacent two substrates.

Claim 23 recites "one or a plurality of elastic connecting regions in direct contact with adjacent ones of the substrates", which lacks support as described for claim 14.

Claim 23 recites "connecting regions...arranged directly on the flat surface of the heat sink" which does seem to have support. This language is certainly not found in the specification. In fact, the most relevant portion of the specification seems to teach away from this feature in discussing an interposing paste: ¶33 In 3-5 states "rear sides...of the partial substrates...for thermal contact with a heat sink...to which...paste...is applied". The language of the specification does not make it clear if the paste is optional, but there appears to be no mention of direct contact. Further, in both Figures 1 and 3, the substrate regions seem to have a gap between them and the heat sink.

All pending claims are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

All independent claims (1, 14, 23 and 24) recite "a thickness of the...module is reduced between adjacent substrate...due to the recess" which is an inaccurate description of the disclosed invention, leaving it unclear what is meant by the term

"thickness" as used in these claims. Referring to, e.g., Fig 1, the module housing is 20 and it has a nearly constant thickness, which is not reduced in the connecting area 30.

It appears that the clearest correction is deleting this recitation from all the claims.

All other pending claims contain this indefiniteness by dependency.

Claim Rejections - 35 USC § 102

Claims 14, 23 and 24 are rejected under 35 U.S.C. 102(b) as anticipated by
Watari (US 4,744,007).

RE claim 14, Watari discloses a power semiconductor module comprising (Fig 1)
a plurality of substrate elements (31, col 3 ln 67) having top and bottom surface
and side walls, each substrate element comprising a semiconductor component (32)
arranged on the top surface of a substrate element;
a plurality of elastic connecting elements (vertical sidewalls of 33, col 4 ln 1)
directly contacting opposing side walls of two adjacent substrate elements (the plurality
of 33 each directly contact their corresponding substrate elements),
wherein said connecting elements are "designed to prevent a deformation of one
substrate element to continue to an adjacent substrate element";
a "plastic injection-molded" (e.g., MPEP § 2113) module housing (collection of
discrete 33s) enclosing said plurality of substrate elements;

wherein the connecting elements are formed by recesses (Fig 2) in the module housing extending from an exterior of the housing and are arranged between adjacent substrate elements; and

“wherein a thickness of the power semiconductor module is reduced between adjacent substrate elements due to the recesses” (insofar as this is understood).

RE claim 23, Watari discloses a power semiconductor module comprising (Fig 1) a heat sink (e.g., 1 can be the recited “heat sink” per MPEP § 2111; or, the claims also read on Fig 7, where 41 is the heat sink) having a flat surface,

a plurality of substrates (31, col 3 ln 67) arranged on the flat surface of the heat sink (clearly when 1 is the heat sink; if 41 is the heat sink, they are indirectly “on”);

a plurality of semiconductor components (32) arranged on the substrates,

a plurality of elastic connecting regions (vertical sidewalls of 33, col 4 ln 1) in direct contact with adjacent ones of the substrates (the plurality of adjacent 33 each directly contact their corresponding substrates) and arranged “directly on” (some gap on) the flat surface of the heat sink between adjacent ones of the substrates,

wherein the connecting regions are “designed to prevent a deformation of one substrate to continue to an adjacent substrate” and

the connecting regions are formed by recesses (Fig 2) in a “plastic injection-molded” (does not structurally distinguish, e.g., MPEP § 2113) module housing (collection of discrete 33s) enclosing said substrates, each recess extending from an exterior of the housing and being arranged between adjacent substrates,

"wherein a thickness of the power semiconductor module is reduced between adjacent substrates due to the recesses" (insofar as this language is understood).

RE claim 24, Watari discloses a power semiconductor module, comprising:

a substrate segmented into a plurality of spaced apart substrate regions (31, col 3 ln 67);

at least one semiconductor component (32, col 3 ln 67) arranged on one or more of the substrate regions;

a "plastic injection-molded" (does not structurally distinguish, e.g., MPEP § 2113) module housing (collection of discrete 33s) enclosing said substrate regions and said at least one semiconductor component;

connecting regions (vertical sidewalls of 33) formed by recesses (Fig 2) in the module housing, each recess extending from an exterior of the housing and being arranged between adjacent substrate regions;

wherein the connecting region "functions as an articulated hinge with each of the adjacent substrate regions so that the adjacent substrate regions can move relative to one another about the articulated hinges" (e.g., MPEP § 2114); and

"wherein a thickness of the power semiconductor module is reduced between adjacent substrate regions due to the recesses" (insofar as understood).

Other Relevant Art

Fromme (EP 1083599) anticipates claim 24 and would anticipate claim 23 if it were corrected to overcome the lack of written description rejection above. There is no

support in the disclosure for the connecting element to directly contact the heat sink. Claims 1 and 14 overcome Fromme by require direct contact to side faces of the substrates, which has support.

Edwards (US 2005/0146023) is not available as prior art, but is noted for disclosing a similar feature to that identified as allowable in the instant application.

Allowable Subject Matter

Claim 1 would be allowable if amended to overcome the indefiniteness rejection above; e.g., by deleting the last limitation therefrom.

It seems this whole application could be placed in condition for allowance if a few amendments were made. An Examiners Amendment is offered and an interview invited to discuss mutually agreeable claim language.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew O. Arena whose telephone number is 571-272-5976. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne A. Gurley can be reached on 571- 272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. For more info about PAIR, see <http://pair-direct.uspto.gov>. For questions PAIR access, contact the Electronic Business Center at 866-217-9197 (toll-free). For assistance from a USPTO Customer Service Rep or access to the automated info system, call 800-786-9199 or 571-272-1000.

/Andrew O. Arena/
Examiner, Art Unit 2811
26 August 2011

/LYNNE GURLEY/
Supervisory Patent Examiner, Art
Unit 2811